|  |
| --- |
| Objective(s) |
| 1. explain the sources of genetic variation. **Bloom’s- knowledge** |
| 2. discuss the differences between single-gene and polygenic traits. **Bloom’s- Comprehension** |
| 3. discuss the different ways the natural selection acts on single-gene and polygenic traits. **Bloom’s- Comprehension**  4. compare and list the different types of selection. **Bloom’s- Comprehension and knowledge** |
| 5. define genetic drift. **Bloom’s- knowledge**  6. relate genetic drift to natural selection. **Bloom’s-Comprehension** |
| 7. explain the conditions in which evolution does not occur. **Bloom’s- knowledge** |
| 8. define and explain the Hardy-Weinberg principle. **Bloom’s-knowledge**  9. list the five conditions that are required to maintain genetic equilibrium. **Bloom’s- knowledge** |
| 10. explain the process of speciation. **Bloom’s- knowledge** |
| 11. list and compare and contrast the different types of isolating mechanisms. **Bloom’s-knowledge and comprehension** |
| 12. discuss how natural selection can be viewed in nature. **Bloom’s- Comprehension** |
| 13. discuss natural selection by using the work of Darwin’s finches. **Bloom’s- Comprehension** |
| 14. explain that the study of evolution is an ongoing process. **Bloom’s-knowledge** |

Brock Parrott

3/15/11

Objectives and Answer Key

Chapter 16-Evolution of Population Unit Exam

**Part A-Multiple Choice- For each question circle the correct answer. (2pts. Each)**

1. What is the main source of genetic variation? (1)
2. Mutation
3. Gene Shuffling
4. Crossing-over
5. **All of the above**
6. In humans, a widow peak is an example of a \_\_\_\_\_\_\_\_. (2)
7. Polygenic trait
8. **Single-gene trait**
9. Crossing-over
10. None of the above
11. Height in humans is a classic example of \_\_\_\_\_\_\_\_. (2)
12. **Polygenic trait**
13. Single-gene trait
14. Crossing-over
15. All of the above
16. In a population of mice, the largest and smallest mice are the individuals least likely to survive. What kind of natural selection is most likely to occur in this situation? (4)
17. **Stabilizing selection**
18. Disruptive selection
19. Genetic selection
20. Direction selection
21. Random change in allele frequency is often called \_\_\_\_\_\_? (5)
22. Founder effect
23. **Genetic drift**
24. Crossing-over
25. Gene shuffling
26. The\_\_\_\_\_\_\_\_\_\_\_ states that allele frequencies will remain constant unless one or more factors cause those frequencies to change? (7&8)
27. Natural selection principle
28. Darwin’s theory of evolution
29. **Hardy-Weinberg principle**
30. Stabilizing selection principle
31. What is it called when two different species do not breed due to their differences of courtship rituals or other reproductive strategies? (11)
32. Temporal isolation
33. Geographic isolation
34. **Behavioral isolation**
35. Strategy isolation
36. What type of bird did Darwin observe to test natural selection in nature? (12)
37. Black bird
38. Warblers
39. Crows
40. **Finches**
41. What factor or factors can cause speciation? (10)
42. Mutation
43. Genetic drift
44. Gene flow
45. Isolation
46. **All of the above**
47. A situation in which allele frequencies change as a result of migration of a small subgroup of a population is know as: (6)
48. Bottleneck effect
49. Hitch hiking
50. Replacement effect
51. **Founder effect**

**Part B- True/False- Put either True or False in the blank next to the following questions. (2pts. Each)**

1.\_\_**False**\_\_Scientists know everything there is to know about evolution. It is not an ongoing process. (14)

2.\_\_**True**\_\_Darwin hypothesized that the birds he was studying had descended from a common ancestor. (13)

3.\_\_**True**\_\_Genetic equilibrium occurs when allele frequencies in a population remain constant. (8)

4.\_\_**True**\_\_Natural selection on single-gene traits can lead to changes in allele frequencies and thus to evolution. (3)

5.\_\_**False**\_\_The effects of natural selection are less complex for polygenic traits. (3)

6.\_\_**False**\_\_According to the Hardy-Weinberg principle, allele frequencies will remain constant if the population size is small. (8&9)

7.\_\_**False**\_\_Temporal isolation occurs when two or more species reproduce at different temperatures. (11)

8.\_\_**False**\_\_Mutations always affect an organism’s phenotype. (1)

9.\_\_**True\_\_**Most heritable differences are due to gene shuffling that occur during the production of gametes. (1)

10.\_**True**\_\_A polygenic trait can have many possible genotypes and phenotypes. (2)

**Part C- Short Answers- Answer the following questions with complete sentences. Please make sure you answer each question completely. Partial credit will be given for answers close to the correct response. (5 pts each)**

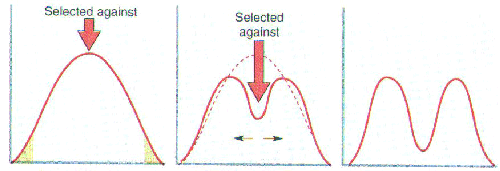
1. Describe the Hardy-Weinberg principle and list the five conditions required to maintain genetic equilibrium? (8)

**Answer- The Hardy-Weinberg principle states that allele frequencies in a population will remain constant unless one or more factors cause those frequencies to change. The situation were allele frequencies remain constant is called genetic equilibrium. If the allele frequencies do not change, the population will not evolve. The five conditions that are required to maintain genetic equilibrium are random mating, large population, no movement in or out of population, no mutations, and no natural selection.**

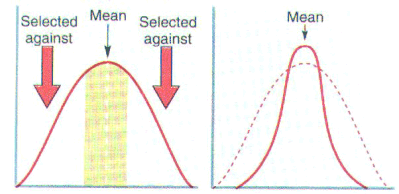
1. Define genetic drift and explain how it is different than natural selection? (6)

**Genetic drift is the change in the frequency of alleles in a population due to random sampling. Genetic drift occurs when the population size is limited and therefore by chance, certain alleles increase or decrease in frequency. This can result in a shift away from Hardy-Weinberg equilibrium. Unlike natural selection, genetic drift is random and rarely produces adaptations to the environment.**

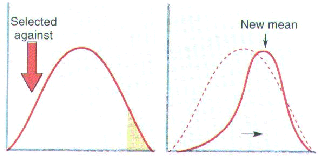
1. For each figure: describe what type of the selection the figure represents and give a description of each type of selection. (4)



Type of selection- **Disruptive Selection-** Description **-Disruptive selection occurs when individuals at the upper and lower ends of the curve have higher fitness than individuals near the middle.**



Type of selection- **Stabilizing Selection-** Description -**Stabilizing selection occurs when individuals near the center of a curve have higher fitness than individuals at either end.**



Type of selection- **Directional Selection-** Description-**Directional selection occurs when individuals at one end of a curve have higher fitness than individuals in the middle or at the other end.**